FLOOD HAZARD ANALYSES

CITY OF CANBY AND VICINITY

YELLOW MEDICINE COUNTY, MINNESOTA

Prepared by

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

assisting the

YELLOW MEDICINE SOIL AND WATER CONSERVATION DISTRICT

in cooperation with

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

the

LAC QUI PARLE - YELLOW BANK WATERSHED DISTRICT

and the

CITY OF CANBY, MINNESOTA

FEBRUARY 1973

FOREWORD

Prerequisite to any comprehensive approach to prevent and reduce flood damages is the need to determine the flood hazards under existing conditions and for future conditions due to expected changes in land use and development. In the absence of information upon which to guide development, flood damages increase and additional public and private funds are expended to protect or rehabilitate flood plain properties.

This Flood Hazard Analyses Report provides flood hazard information for areas in and near the City of Canby, Minnesota. The report is to serve as a technical tool to enable local residents and officials to initiate programs to minimize vulnerability to flood damage.

This study was carried out under a joint coordination agreement between the Soil Conservation Service and the Minnesota Department of Natural Resources in cooperation with the Lac Qui Parle-Yellow Bank Watershed District and the City of Canby.

The technical phases of the report were prepared by the Soil Conservation Service, U. S. Department of Agriculture, assisting the Yellow Medicine Soil and Water Conservation District. The Soil Conservation Service prepares flood hazard analyses in accordance with Recommendation 9(c) of House Document No. 465, 89th Congress, under the authority of Section 6 of Public Law 83-566. The Watershed Protection and Flood Prevention Act.

The section of the report devoted to flood plain management was prepared by the Minnesota Department of Natural Resources, Division of Waters, Soils, and Minerals.

The Soil Conservation Service and the Minnesota Department of Natural Resources will provide interpretation and technical assistance in the application of the flood hazard data presented in this report.

TABLE OF CONTENTS

PHOTOGRAPHS

FIGURES

MAPS AND DRAWINGS

Maps and drawings are included following page 20 in the following sequence:

INTRODUCTION

The primary purpose of this report is to identify the existing flood hazard areas in and near the City of Canby to provide a basis for further study and planning by local residents and officials in order to initiate an effective land use and management program.

The identification of flood hazard areas only establishes where flood plain management programs should be applied. Management programs for flood hazard areas are related to the overall plans for land use and development in the community. Such programs can be formulated only through a thorough knowledge of the community, its needs and plans, and the characteristics of flooding and flood damage in the area.

To provide information that may assist in management decisions, the report describes some of the characteristics of the area that relate to flooding and flood damage. It also describes a proposed watershed project under consideration by the community.

The section entitled "Flood Potential" describes the rationale used in defining flood hazard areas and the procedures used in this study.

The last section describes the aspects of flood plain management and the alternatives that should be considered in formulating a local flood plain management program.

DESCRIPTION OF THE STUDY AREA

Study Area Limits

The areas in and near Canby covered in this report are subject to flooding from Canby Creek and County Ditch No. 19. The areas studied are within the jurisdictional limits of the City for the application of zoning and subdivision regulations containing flood plain management provisions. The limits of the study area are shown on the index map.

The Community

Canby has a 1970 census population of 2,147 people and covers an area of approximately 2.0 square miles within the corporate limits. The City has approximately 125 business and commercial establishments and 625 homes.

Watershed and Stream Characteristics

Canby Creek - Canby Creek rises in the southwest corner of Yellow Medicine County, flows northeast through Canby and joins Lazarus Creek about four miles northeast of Canby. The drainage area is 25.8 square miles at the upper end of the study reach and 27.4 square miles at the lower end.

Above Canby, the upper third of the watershed is a gently rolling to undulating plateau containing several small marsh areas. The lower two-thirds of the watershed contains rolling, steep, hilly land with short slopes and numerous knolls. The watershed in the vicinity of Canby is a gently sloping glacial lake plain.

The minimum fall of the creek is 15 feet per mile which occurs in the study reach. The maximum fall is 68 feet per mile which occurs in the middle third of the watershed above Canby.

Approximately 62 percent of the watershed is in cropland, producing mainly corn, soybeans, small grain and hay. About 25 percent is in pasture land and the remaining land is wildlife habitat, forest land, farmsteads, roads and urban areas.

County Ditch No. 19 - County Ditch No. 19 is a legal drainage ditch constructed about 1920. The ditch originates approximately a quarter mile west of Canby and outlets into Lazarus Creek about 1.5 miles north of Canby. (See index map.) A natural intermittent stream (not named) exists upstream from the ditch. The drainage area is 2.4 square miles at the upper end of the study reach and 4.7 square miles at the outlet.

The watershed upstream from Canby is undulating to gently rolling land. The watershed in the vicinity of Canby and downstream to the outlet consists of a gently sloping glacial lake plain. The land use in the watershed is similar to that of Canby Creek.

The average fall through the study reach is 28 feet per mile. The maximum fall is 98 feet per mile in the upper portion.

Flood Characteristics

Flooding occurs in and near Canby on the average of once every five years. Floods in recent years occurred in 1952, 1957, 1962, 1963, 1965, 1969, and 1970. Flooding is due to the inadequate capacity of Canby Creek and County Ditch No. 19 during periods of excessive runoff from rainfall, snowmelt, or a combination of the two. Flooding is of short duration, lasting less than a day in most cases.

Canby Creek has an entrenched flood plain from the upper end of the study reach downstream to the vicinity of Eighth Street in Canby. From this point downstream, the creek flows through a glacial lake plain that slopes gently to the northeast. Since there is no defined flood plain in this reach, floodwaters north of the channel do not flow in the

direction of the channel flow but flow northeast in the form of surface flow. Although flooding is extensive in this area it is generally shallow except where backwater is caused by roads or other obstructions.

Much of the area flooded by County Ditch No. 19 is also in the form of shallow surface flow. The flood plain is well entrenched upstream from the point where the ditch turns north near the west boundary of the corporate limits. At this point floodwaters from a large flood flow east over the railroad and northeast through the urban area. Many of the homes in this area are subject to only shallow flooding or surrounded by water flowing down the city streets.

At the point where County Ditch No. 19 turns north at the north boundary of the corporate limits, floodwaters again flow east and north in the form of shallow surface flow and combine with the floodwaters from Canby Creek near the east boundary of the corporate limits.

FLOOD HISTORY

Following are descriptions and photos of some past floods in the Canby area taken from the Canby News and local flood reports. Note that in some of the newspaper articles, what is now called Canby Creek was called "Lazarus Creek".

Canby News, July 9, 1920

"One of the heaviest rain storms that has visited Canby and the surrounding territory in a number of years, hit here Sunday evening, July 4, at 5:45 o'clock. The rain continued falling with a torrential force for more than two hours during which time 3.38 inches of water fell in Canby according to local observer G. E. Kidder."

"The result of the severe rain...created a flood condition over the lowlands that swept away fences, bridges...portions of gravelled

and dirt roads....and sections of the Northwestern Railroad tracks between Canby and Porter ranging from five to several hundred feet in length. Woodpiles, straw and haystacks, fences and garden patches along the creek sides in the northeast part of town were heavy sufferers from the flood and many cellars were found to be full of water Monday morning in that section of town."

"It is estimated by some that the damage to roads, bridges, and fences alone to say nothing of the damage to crops and railway tracks could be placed easily at more than $100,000 in this community."

Canby News, April 16, 1952

"Lazarus Creek flowing out of Sylvan Lake in this city began to crowd its banks Monday and toward evening began to surround some homes in the east part of town. Sections of the sidewalk and street approaches to the bridge at Custer Avenue and Second Street were partly washed out, but by morning, Tuesday, the waters had receded."

"The dam in the lake which regulates the flow into the creek was also damaged somewhat by washouts and workmen began repairs Tuesday morning. The lake itself spread out and flooded the low parts of Canby Cemetery."

Canby News, March 29, 1962

"Lazarus Creek lived up to its name, rising as one from the dead, and caused a flash flood in the creek areas in Canby on Tuesday afternoon. Local residents called it the worst flood since 1920."

"By 4:00 p.m. the raging waters had covered the floor of the bridge at Second Street and Custer Avenue and waters lapped at the edges of the Oscar and Don Saltee homes, the Vernon Mass home, the home of John Hart and the Irma Bultinek home. The water came over the floor of the Glenn Goslar house..."

"The street department set up barricades at First and Custer and at Custer and Second Streets. Hundreds of residents watched as the floodwaters gradually spread out, threatening more homes in the low areas."

"A blast of dynamite prevented flooding at the Town and Country Lanes, where a huge lake had formed, almost surrounding the bowling spot and the Vern Johnson home nearby. Fast moving waters along the KT road washed out several side roads."

July 26, 1963

On July 26, 1963, a severe rainstorm occurred in the Canby Creek Watershed. Although no attempt was made to determine the extent of the storm, 5.23 inches of rain fell in three hours in Canby.

According to the Canby News, two people were injured, (one hospitalized) and several families had to be evacuated from their homes with boats. Highway 68 was closed in both directions within the city limits where water inundated the highway. Highway 75 was inundated for three-fourths of a mile northeast of Canby.

A survey was taken to determine the monetary losses caused by this flood. Following is a summary of the results of the survey for the Canby Area.

City of Canby Municipal Property	$16,650.00
City of Canby Personal Property	18,369.10
City of Canby Business Property	12,013.70
Railroad Property	20,000.00
Farm Property	5,550.00
State Property	1,700.00
County Property	7,620.00
Total	$81,902.80

It was felt by the local residents that a loss of life and much more serious damage was prevented because of the numerous volunteers who were aware of the heavy rain and assisted in evacuating people and moving property to higher elevations.

Canby News, April 10, 1969

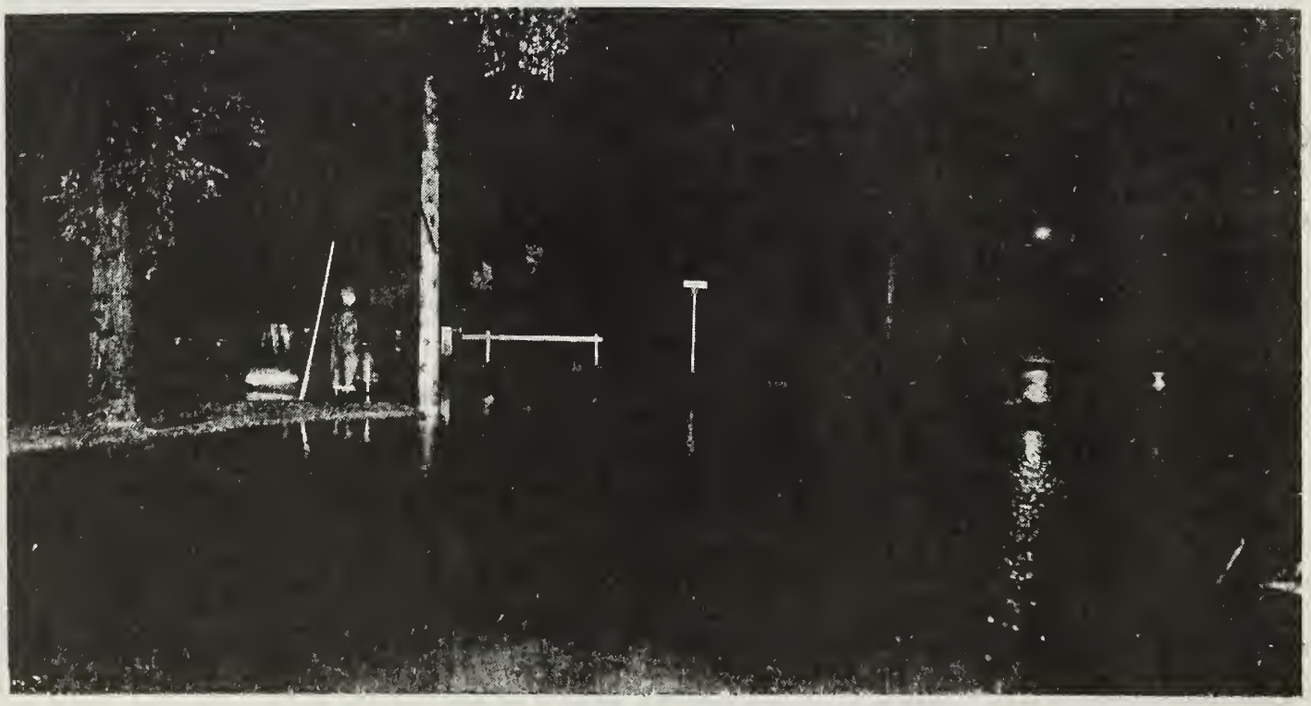
SORRY, NO BUS SERVICE today! Good Friday morning the waters rose and flowed through the school bus garage next to Highway 68 in Canby. The heating system was off the floor and little damage was done except for the mess, it was reported. The busses were all parked elsewhere Monday as the cleanup job commenced. CANBY NEWS PHOTO

FLOOD WATER FLIES in all directions as a car heads west of Canby on Highway 68 about 4 p.m. Saturday. The water had come from the west drainage ditch, across the fields, athletic field, isolated the school garage and finally crossed the highway and onto lawns and into streets running northwest. Shortly after this picture was taken, a detour sign was erected as the water cut under the tarvia surface. CANBY NEWS PHOTO

Canby News, June 25, 1970

WATER, WATER everywhere was the scene at 3:45 a.m. June 16 as Canby just finished receiving its 3rd inch of rain in three days, the final 1.78 inches coming in just a few hours. This picture is of the intersection of 2nd St. East and Custer Avenue and the bridge over Canby Creek is just to the left of the picture. Vernon Maas is standing on the corner watching the water which surrounded several homes next to the creek. Just a couple hours later, the water had subsided and was back in the creek bed, but as it continued downstream, it washed out bridges and culverts and cut up roads.

CANBY NEWS PHOTO



HEAVY RAINS during the early hours June 16 caused the water to run just above the bed of the bridge over Canby Creek on Custer Avenue. Debris from the flash-flood remained all over the low land surrounding the creek, but the high water was shortlasted here in Canby. The boards at the dam went out about 3:15 a.m. and the flood commenced, but several hours later, the water was back within the confines of the creek bed.

CANBY NEWS PHOTO

PROPOSED FLOOD CONTROL MEASURES

Proposed Canby Creek Watershed Project

The Yellow Medicine and Lincoln County Soil and Water Conservation Districts, with technical assistance provided by the Soil Conservation Service, completed development of the Canby Creek Watershed Work Plan in June 1972. Implementation of the plan will reduce flooding throughout the study area and also downstream to the Lac Qui Parle River.

Included in the work plan are needed land treatment on about 5,000 acres of cropland, 2,500 acres of pasture land, 50 acres of other (wildlife) land and 110 acres of forest land. Structural measures proposed include one multiple purpose reservoir, one floodwater retarding structure and 0.8 mile of stream channel improvement on Canby Creek and one floodwater retarding structure upstream from County Ditch No. 19. (See watershed project map at the end of this report).

FLOOD POTENTIAL

The history of flooding along Canby Creek and County Ditch No. 19 in the vicinity of Canby is not of sufficient length to indicate the true magnitude of the local flood potential. Larger floods than have occurred in the past are likely to occur in the future. A reasonable limit of expected flooding for making flood hazard analyses is the 100-year frequency flood event. Although the term implies that such a flood occurs on the average of once in 100 years, it could occur in consecutive years or more than once in a single year. It has a one percent chance of occurring in any given year.

The 100-year frequency flood was used to delineate the areas subject to inundation in this study area. The flood hazard areas are defined through the use of aerial photos, water surface profiles and valley cross-sections.

Although the 100-year frequency flood at Canby would be larger than any past recorded flood, it should be recognized that still larger floods could occur. Such floods would occur from a severe combination of meteorological and hydrological conditions characteristic of the geographical region.

The following paragraphs describe the procedures used to make the study and prepare the report.

Flood Discharge

No stream gages are available in or near the study area. The discharges for the 10-, 25-, and 100-year frequency floods were determined through the use of the SCS computer program: "Project Formulation Program, Hydrology". This program uses rainfall and runoff relationships and other physical watershed characteristics to predict the discharge that will occur from a rainfall event of a given frequency.

Water Surface Profiles

Water surface profiles for the 10-, 25-, and 100-year frequency flood discharges were developed using stream characteristics determined from field observations, topographic maps and field surveys of the flood plain, roads and bridges. The profiles were computed assuming that all bridges would remain intact and that no clogging by debris or ice would occur. The SCS computer program was used to compute the profiles.

Water surface profiles are shown in the report for the following conditions: a) Under existing conditions and the estimated discharges from the 10-, 25-, and 100-year frequency floods; b) Under expected conditions with the proposed watershed project measures installed and the estimated 100-year frequency flood discharge.

The water surface profiles show the elevation of the water surface along the stream reaches for the various frequency floods, along with the elevation of the channel bottom and the average elevation of the ground adjacent to the channel. The profiles can be used to determine the depth of flooding and the flood protection levels required under existing conditions.

No profiles were developed for the areas subject to flooding from the overflow of County Ditch No. 19 through the urban areas and the north parts of the corporate limits.

Valley Cross Sections

Selected cross sections of the valley are included, showing the elevation of the water surface for the same conditions described for the water surface profiles.

Flood Hazard Areas

Areas subject to inundation by a 100-year frequency flood were delineated for existing watershed and flood plain conditions and for expected conditions following implementation of the proposed watershed work plan. These areas are delineated on aerial photographs taken in June 1967. (See Sheets 1 through 12). The area covered by each photo is shown on the index map.

The water surface profiles for the 100-year frequency flood were used as the basis for the delineation of the flood hazard areas along the stream reaches. The flood hazard areas adjacent to Canby Creek were delineated utilizing valley cross sections and topographic maps with a two foot contour interval and a scale of 400 feet per inch. The flood hazard areas adjacent to County Ditch No. 19 were delineated utilizing valley cross sections and aerial photo interpretation. The area subject to flooding from the overflow of County Ditch No. 19 through the urban area and the north part of the corporate limits was delineated through the use of aerial photo interpretation and from historical flood data.

The locations of the valley cross sections used to analyze the flood hazards along Canby Creek and County Ditch No. 19 are shown on the aerial photos. No cross sections were surveyed in the area subject to flooding from the overflow of County Ditch No. 19 through the urban areas and the north part of the corporate limits. The flood hazard delineations in these areas should be used only as a general guide to the area subject to flooding by the 100-year frequency flood.

Documentation of techncial data is on file with the Soil Conservation Service, 316 North Robert Street, St. Paul, Minnesota 55101.

FLOOD PLAIN MANAGEMENT

With flood hazard information available, the city has the essential technical data to plan the needed land use and development regulations for its flood prone areas. The overall plan of the community, for industrial, commercial, and residential areas, for streets, and utilities, and for parks and schools, can be coordinated with the need to convey floodwaters.

Such community planning procedures are an intergral part of a comprehensive flood plain management program. Flood plain management involves the full range of public policy and action for insuring wise use of the flood plains. It includes everything from collection and dissemination of flood hazard information to actual acquisition of flood plain lands, construction of upstream and instream control measures, and enactment and administration of codes, ordinances, and statutes regulating flood plain land use and development.

A total flood plain management program might be comprised of numerous elements (see figure 1). Some of these are: structural flood control works to protect existing development; regulations to guide new development; flood insurance for owners of existing and new properties; and individual adjustment measures such as flood proofing and relocation.

Flood Control Measures

There is presently proposed a Public Law 83-566 Watershed Protection and Flood Prevention Project for the Canby Creek Watershed. While the proposed project works will control overbank flooding from a 100-year frequency flood in Canby, there are several aspects that remain before the project can be implemented. The tentative work plan as presented at a public meeting in Canby on June 14, 1972, is presently in the review process and will ultimately be subject to Congressional approval. Upon approval, the local sponsors of the project will initiate the necessary

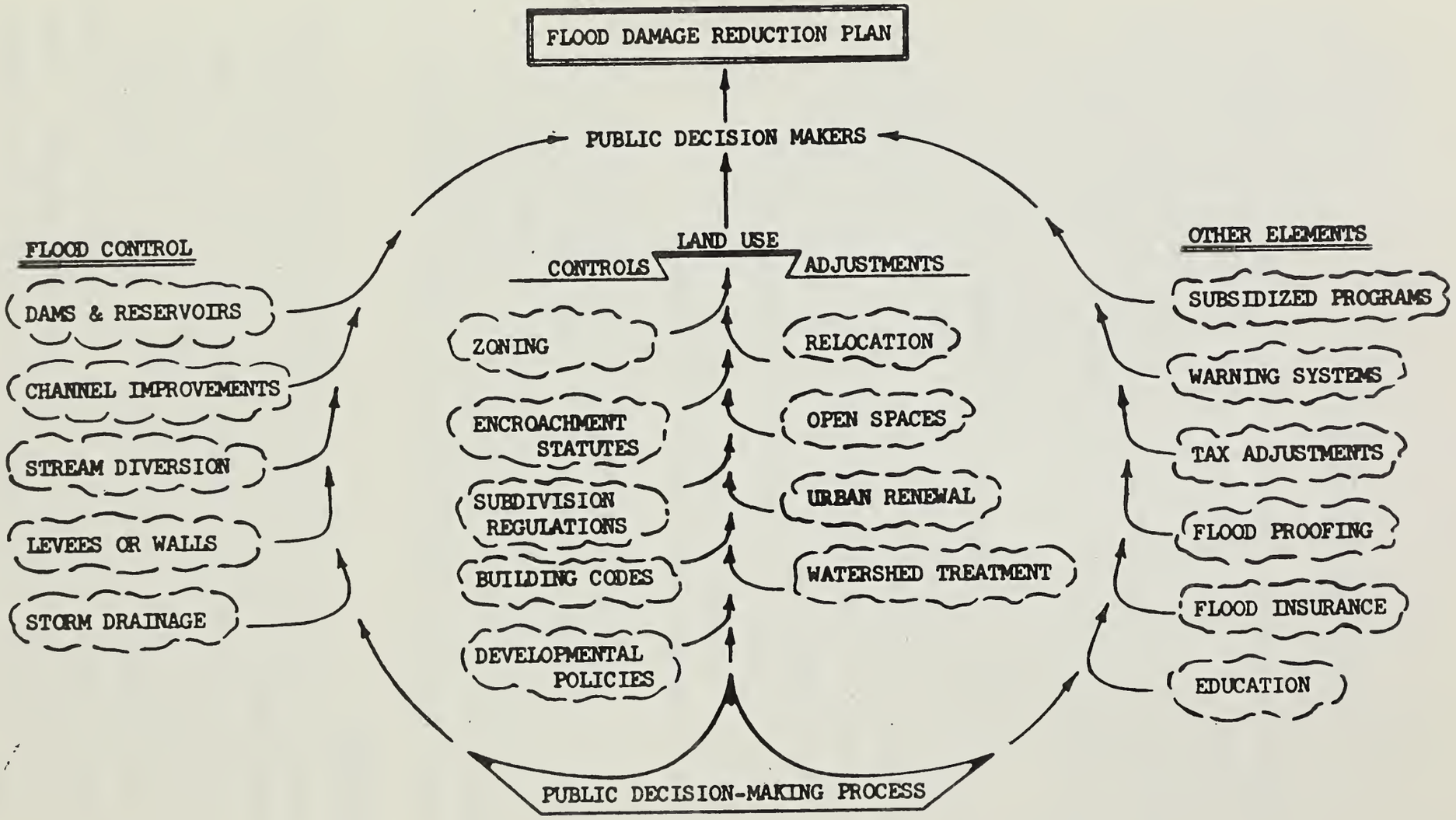


FIGURE 1. Elements for a flood damage reduction plan.

WALL - 1969

hearing, land acquisition, and assessment of benefits to meet the local contribution to the project. With favorable results at every stage of the project review and considering the seven-year construction period, in every likelihood the planned flood protection for Canby cannot be completed in less than 10 years.

In the interim, the flood plain regulations described in the following section should be enacted within the existing flood hazard areas in order to insure that flood damages do not increase. When flood protection works are constructed and operative, these measures can be modified as necessary to reflect the degree of flood protection afforded by such works. To allow for this future modification this report also identifies the flood hazard areas that would exist following installation of the watershed project measures.

In the event that the watershed project is not constructed, local flood plain regulations can serve as a continuing flood damage reduction program. They can also provide an added degree of protection to properties in the event of extreme flood events that might exceed local protective works.

Flood Plain Regulations

In any program for flood damage reduction, a practical solution would not be possible without realistic consideration being given to adoption of flood plain regulations. Such regulations are designed to permit the greatest use of flood plain areas without increasing the flood damage potential. Among the various elements used to accomplish this are zoning ordinances, subdivision regulations, building codes and sanitary regulations.

The Minnesota Legislature in enacting the Flood Plain Management Act of 1969 (Minnesota Statutes, Chapter 104), recognized that flood plain management practices are necessary tools to protect human life

and health and minimize property damages and economic losses. Under the Act, local units of government are required to adopt flood plain regulations whenever sufficient data are available to define flood plain and floodway areas along water courses within their respective jurisdictions.

The basic purpose of flood plain regulations is not to prohibit but to guide developments in flood plain areas consistent with nature's demands for the conveyance of flood flows and the community's land use needs. Regulations that reflect the flood hazard can provide a reasonable degree of flood protection as part of the original formulation. Consequently, flood damage, expenses, and inconveniences to the public can be minimized by flood plain zoning and other flood plain management practices.

The Statewide Standards and Criteria for Management of Flood Plain Areas in Minnesota, developed by the Department of Natural Resources will serve as the basis for determination of compliance with the Flood Plain Management Act and the effectiveness of continued administration and enforcement of local flood plain regulations. State flood plain management standards provide that the delineation of the flood plain and floodway and enactment of flood plain regulations are to be based on the regional (100-year frequency) flood.

Flood plain management standards are based on two objectives: (1) to provide adequate flow capacity and (2) assure wise use of the flood plain. The first need is accomplished by assuring retention of the channel of the stream and as much of the flood plain adjacent to the stream as is needed to convey flood flows without causing excessive increase in flood stages. The area adjacent to the stream is usually subject to frequent flooding and fast-moving water. In a flood plain zoning ordinance this area is commonly called the "floodway district" (See figures 2 and 3). Development in the floodway district is limited to open space type uses having a low flood damage potential and offering a minimum obstruction to the flow of floodwaters. Examples of these

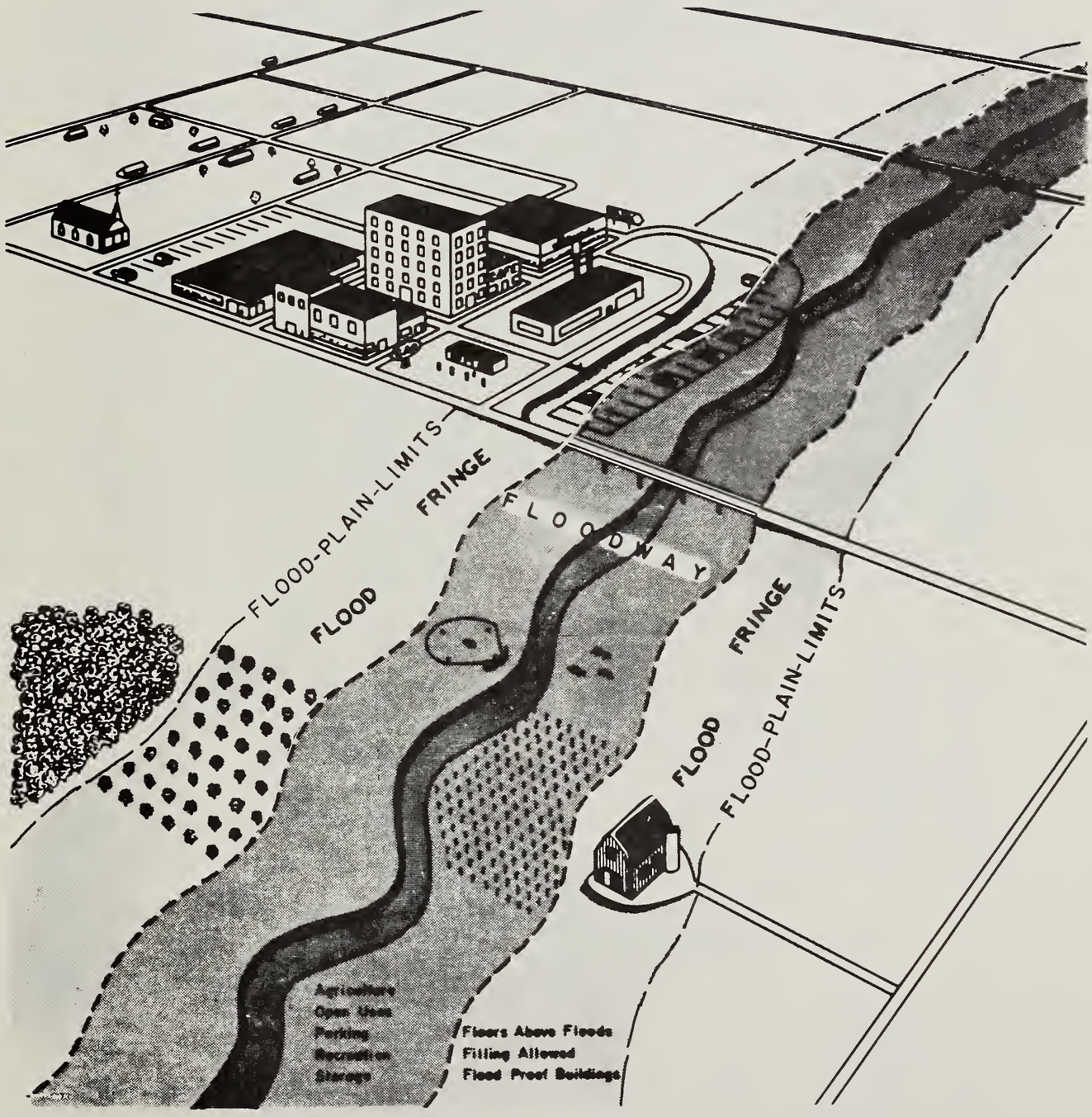


Figure 2. Perspective view of the structure of a regulatory flood plain

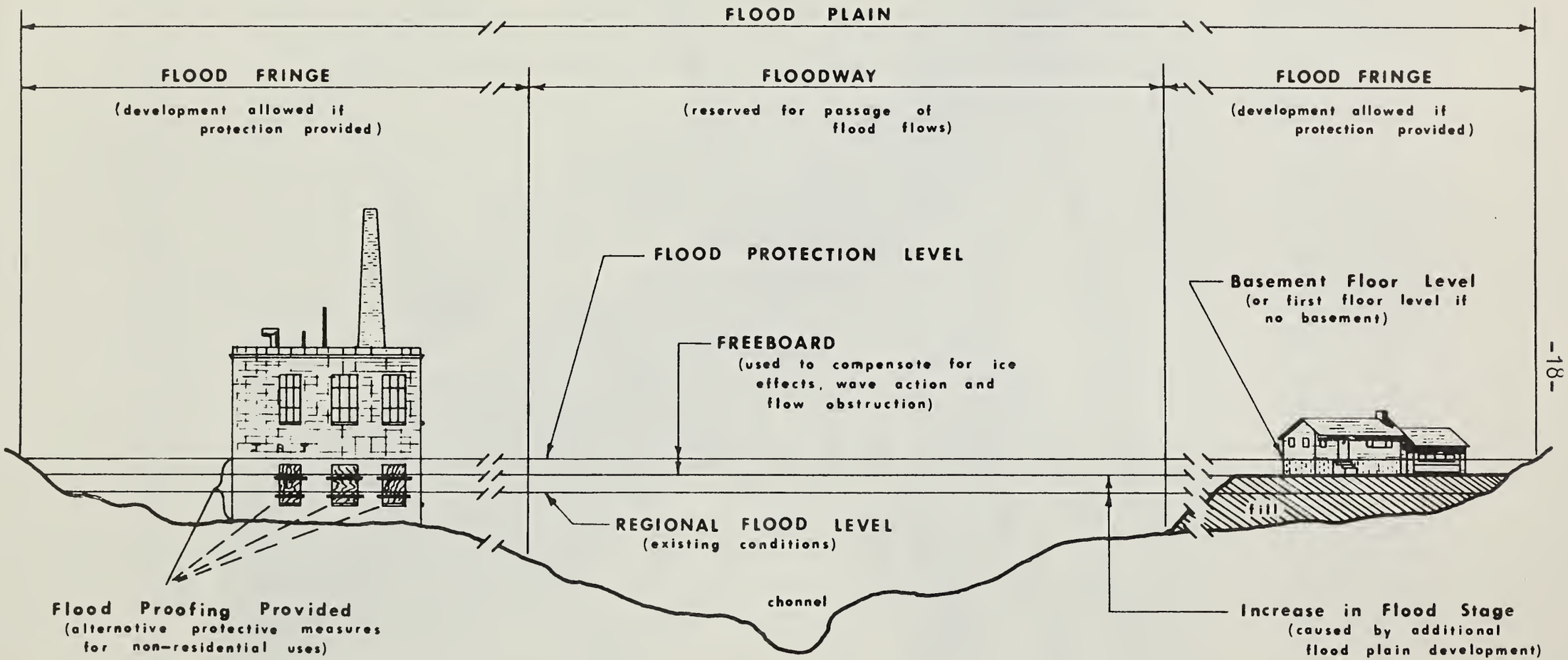


Figure 3 Cross sectional view of the structure of a regulatory flood plain

open uses include: agriculture, parks, parking lots, loading areas, storage yards, and golf courses. To achieve this objective floodways should be selected along Canby Creek and County Ditch No. 19 by community officials in order that they may be evaluated to determine if they are consistent with statewide flood plain management standards.

The second objective to provide for the wise use of the flood plain is achieved through the requirements of flood protection for areas outside the floodway district but still subject to inundation. Such areas are in the flood plain fringe, which is generally contiguous to higher ground. In times of flooding these fringe areas have lesser flooding and slower floodwater movement. Zoning ordinances refer to these areas as "flood fringe districts". Under criteria for flood plain regulations, land uses that are permitted under an existing zoning ordinance may continue to be permitted in the flood plain fringe areas (or the flood fringe district). However, new buildings or additions to existing buildings and areas used for storing materials that are, in the time of flooding, bouyant, flammable or explosive are to be constructed or flood proofed above the flood protection elevation for the particular area (see figure 3).

The community should implement flood plain regulations based on established flood plain encroachment lines and flood plain limits. To assist communities in the implementation of flood plain regulations, the Division of Waters, Soils, and Minerals of the Department of Natural Resources, has developed sample zoning ordinances and subdivision regulations, which are available upon request.

National Flood Insurance Program

Under the National Flood Insurance Act of 1968 (Public Law 90-448) the Secretary of Housing and Urban Development (HUD) is authorized to carry out a National Flood Insurance Program. The program was established to make flood insurance available for losses due to inundation by waters from the overflow of streams, rivers, or other inland waters

or from unusual and rapid accumulation of runoff of surface waters from any source and inundation for mudslides which are caused by accumulation of water on or under the ground. At present, coverage is available for properties used for residential, business, religious and agricultural purposes, properties occupied by non-profit organizations, and properties owned by state or local governments or their agencies. Coverage is available for both structures and their contents.

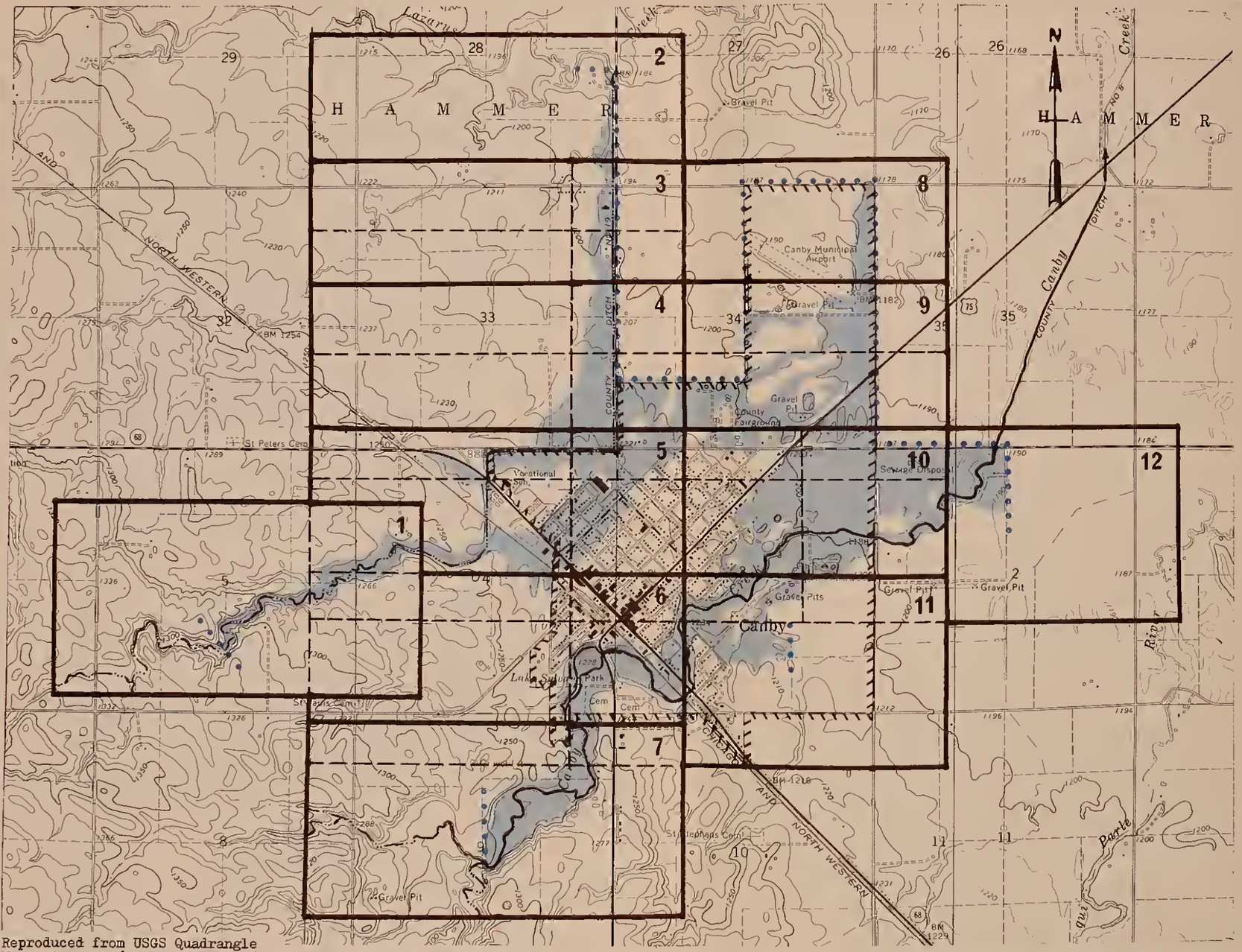
Insurance is sold to property owners or renters only after the community has expressed to HUD an interest in being declared eligible for flood insurance and has adopted land use and control measures for flood hazard areas consistent with criteria set forth in the HUD regulations.

Inquiries for further information about this program may be directed to the Department of Natural Resources or to the Federal Insurance Administration, HUD, Washington, D. C. 20410.

Other Measures

Land use controls such as zoning , subdivision regulations and building codes can play an important role in flood plain management. However, in order for these measures to be effective, it is important that the community take action to implement other programs and measures to supplement these controls. A few possible measures are: (1) open space land acquisition programs; (2) urban renewal programs; (3) preferential tax assessment; (4) flood proofing of existing structures; and (5) public policy governing the construction of public facilities such as bridges, streets, and utilities compatible with the flood hazard and to locate such facilities in a manner to discourage private development in flood prone areas.

The Department of Natural Resources, upon request, will provide assistance to the city in flood proofing techniques, flood insurance concepts, the implementation of a flood warning system and the establishment of a local flood data collection program.



Reproduced from USGS Quadrangle Maps, Canby 1967 and Porter 1967

LEGEND

CORPORATE LIMITS

DETAILED SHEET NO. 5

STUDY AREA LIMITS

EXISTING FLOOD HAZARD AREAS

2000 0 1000 2000

SCALE IN FEET

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SOIL CONSERVATION SERVICE

FLOOD HAZARD ANALYSES CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

INDEX MAP

JUNE 1972

SHEET 1 OF 1

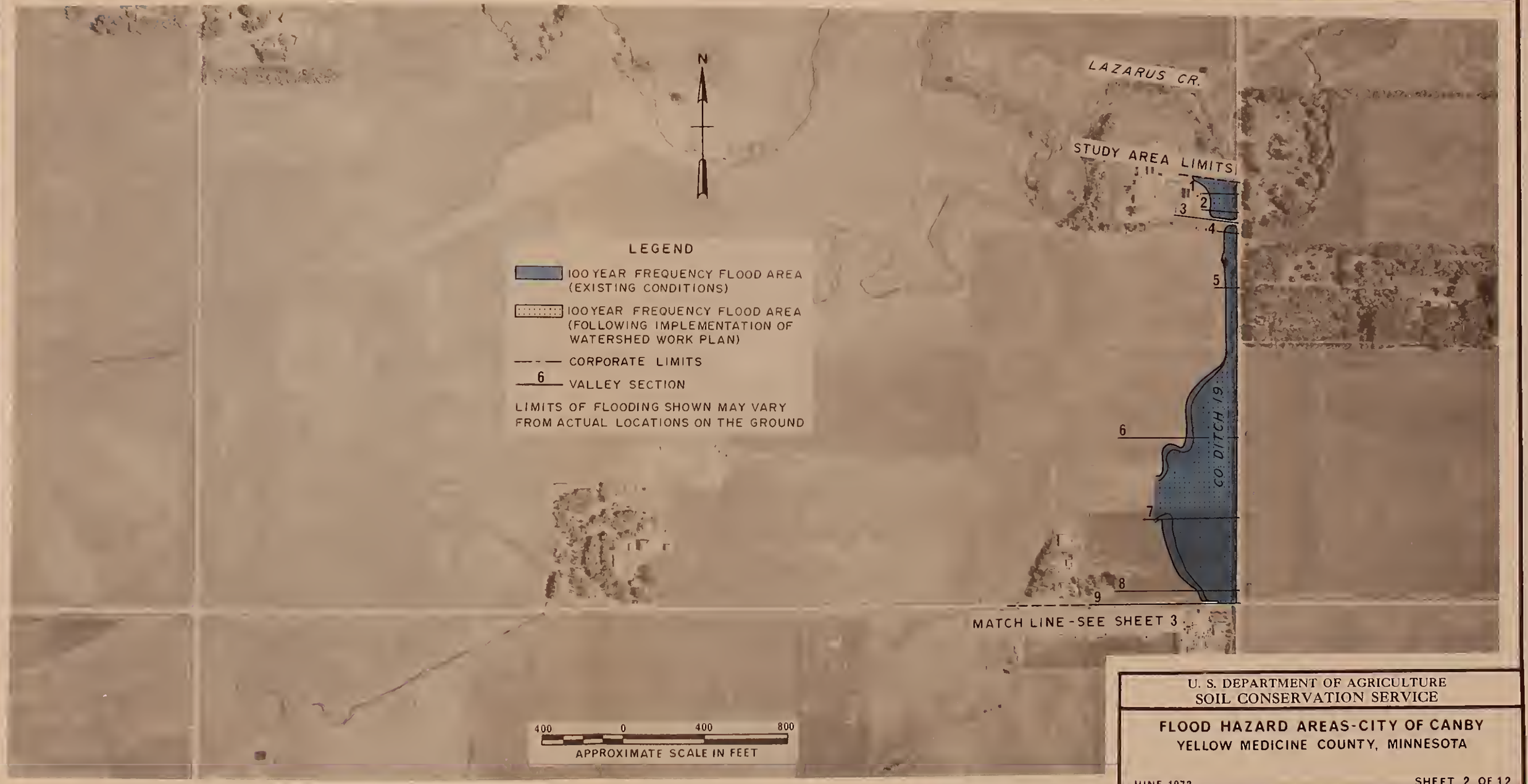
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY

YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

SHEET 1 OF 12



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

SHEET 2 OF 12

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

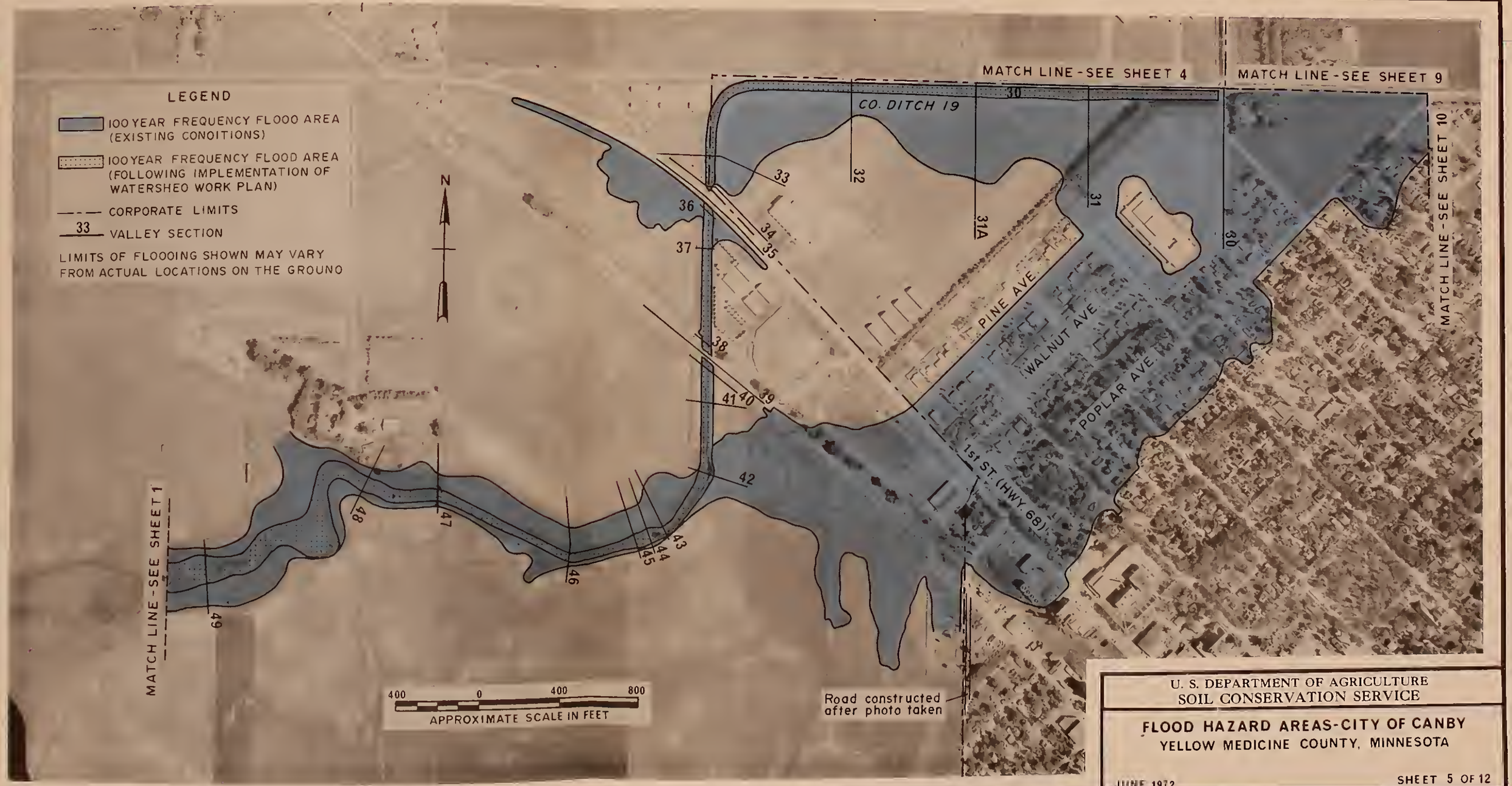
JUNE 1972

SHEET 3 OF 12

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

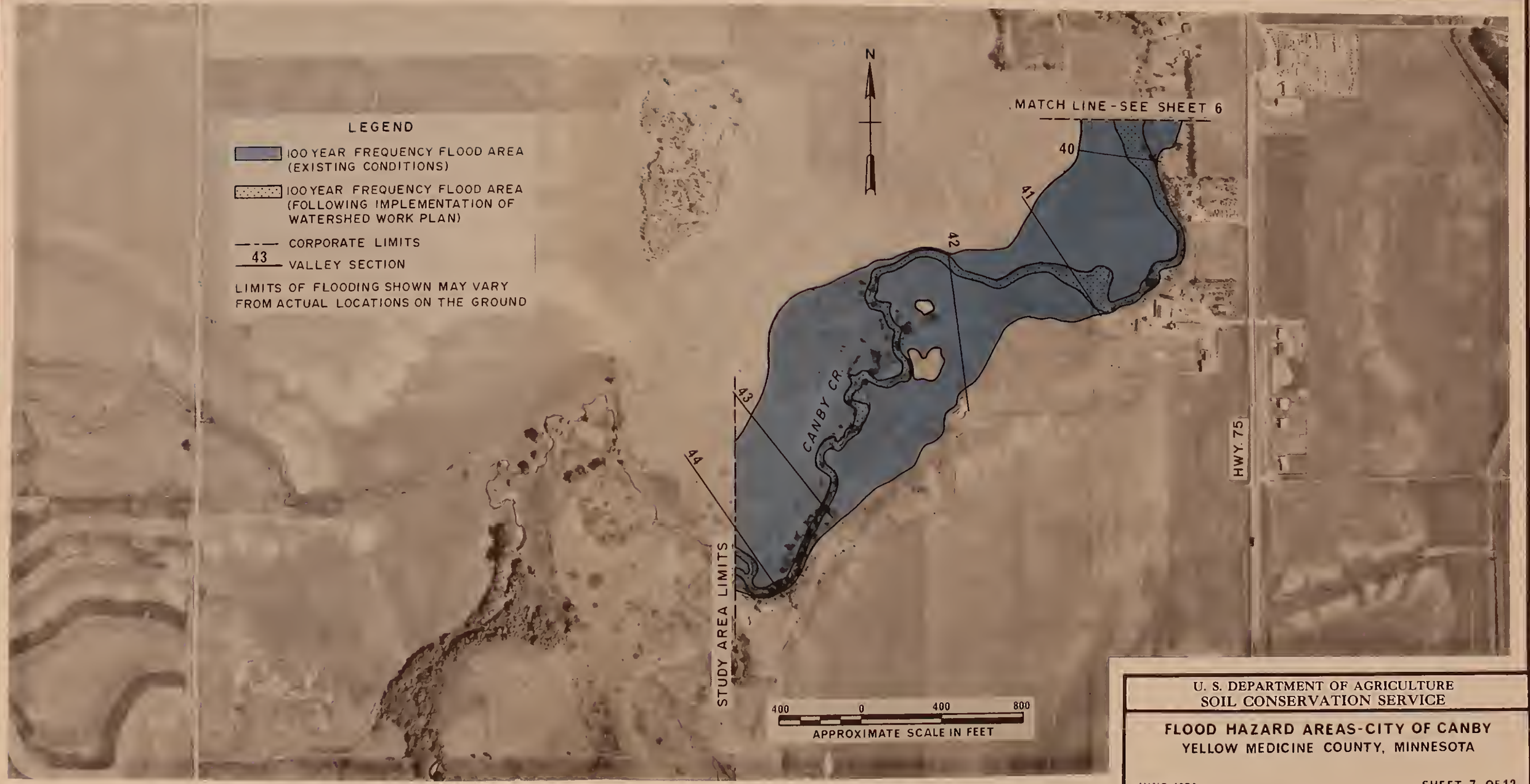
FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

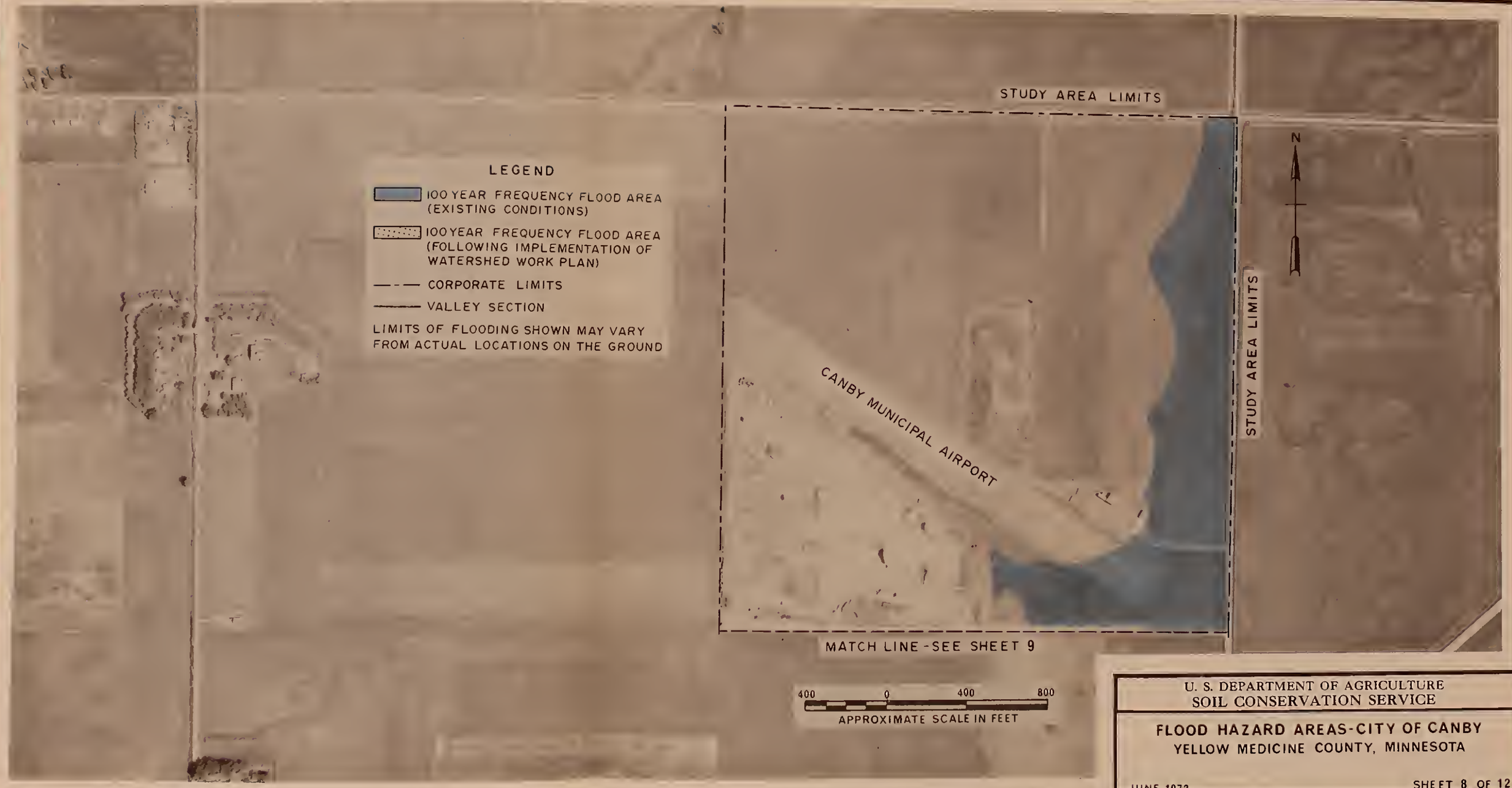


U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

SHEET 7 OF 12



U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

SHEET 9 OF 12

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

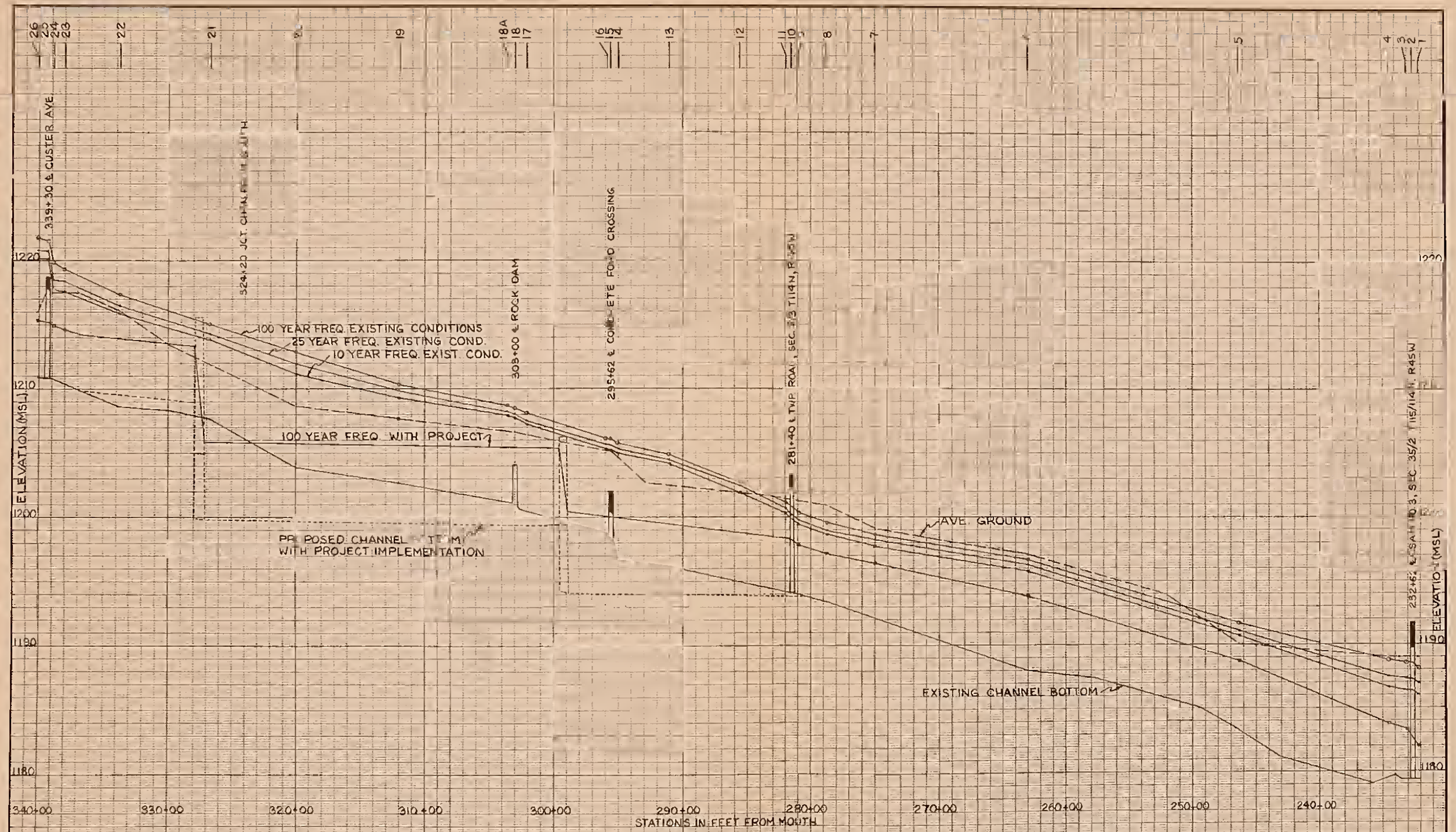
SHEET 11 OF 12

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FLOOD HAZARD AREAS-CITY OF CANBY
YELLOW MEDICINE COUNTY, MINNESOTA

JUNE 1972

SHEET 12 OF 12



WATER SURFACE PROFILES

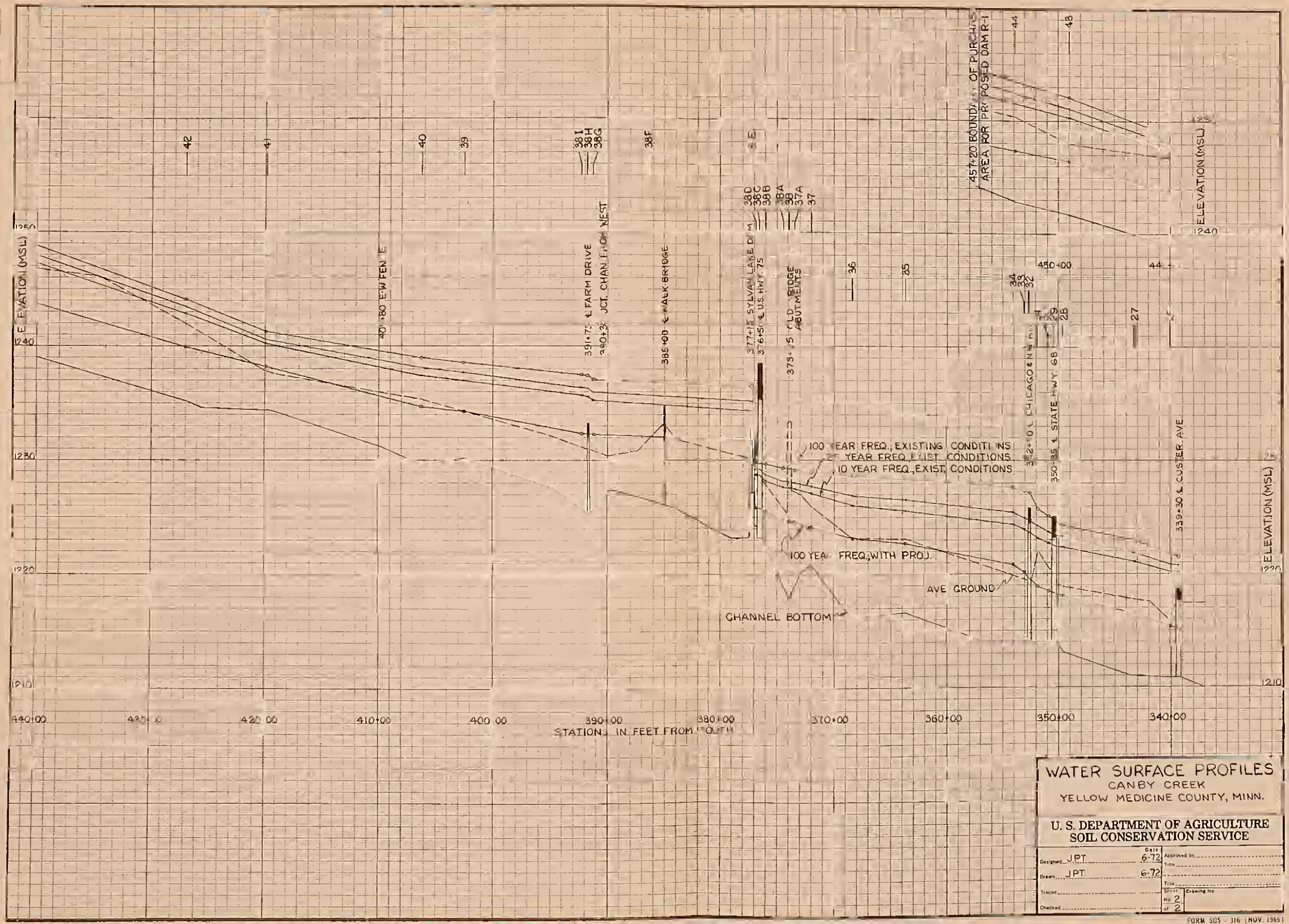
CANBY CREEK

YELLOW MEDICINE COUNTY, MINN.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date	
Designed	JPT	6-72	Approved by
Drawn	JPT	6-72	Title
Traced			Title
Checked			Drawing No. 1 of 2

FORM SCS - 316 (NOV. 1966)

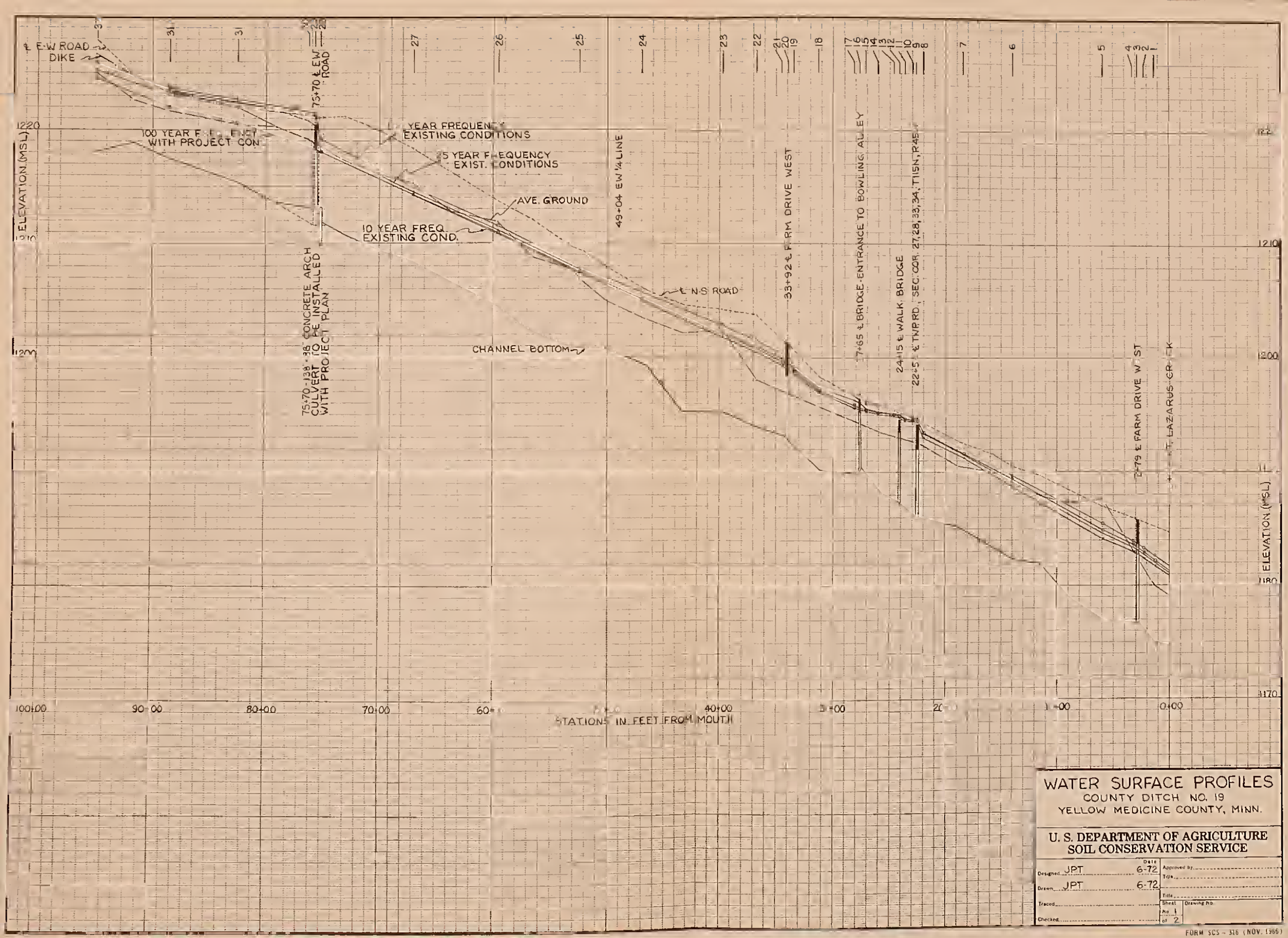


WATER SURFACE PROFILES
CANBY CREEK
YELLOW MEDICINE COUNTY, MINN.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed JPT	Date 6-72	Approved by	
Drawn JPT	6-72	Title	
Traced		Title	
Checked		Sheet No. 2 of 2	Drawing No.

FORM SCS - 316 (NOV. 1965)

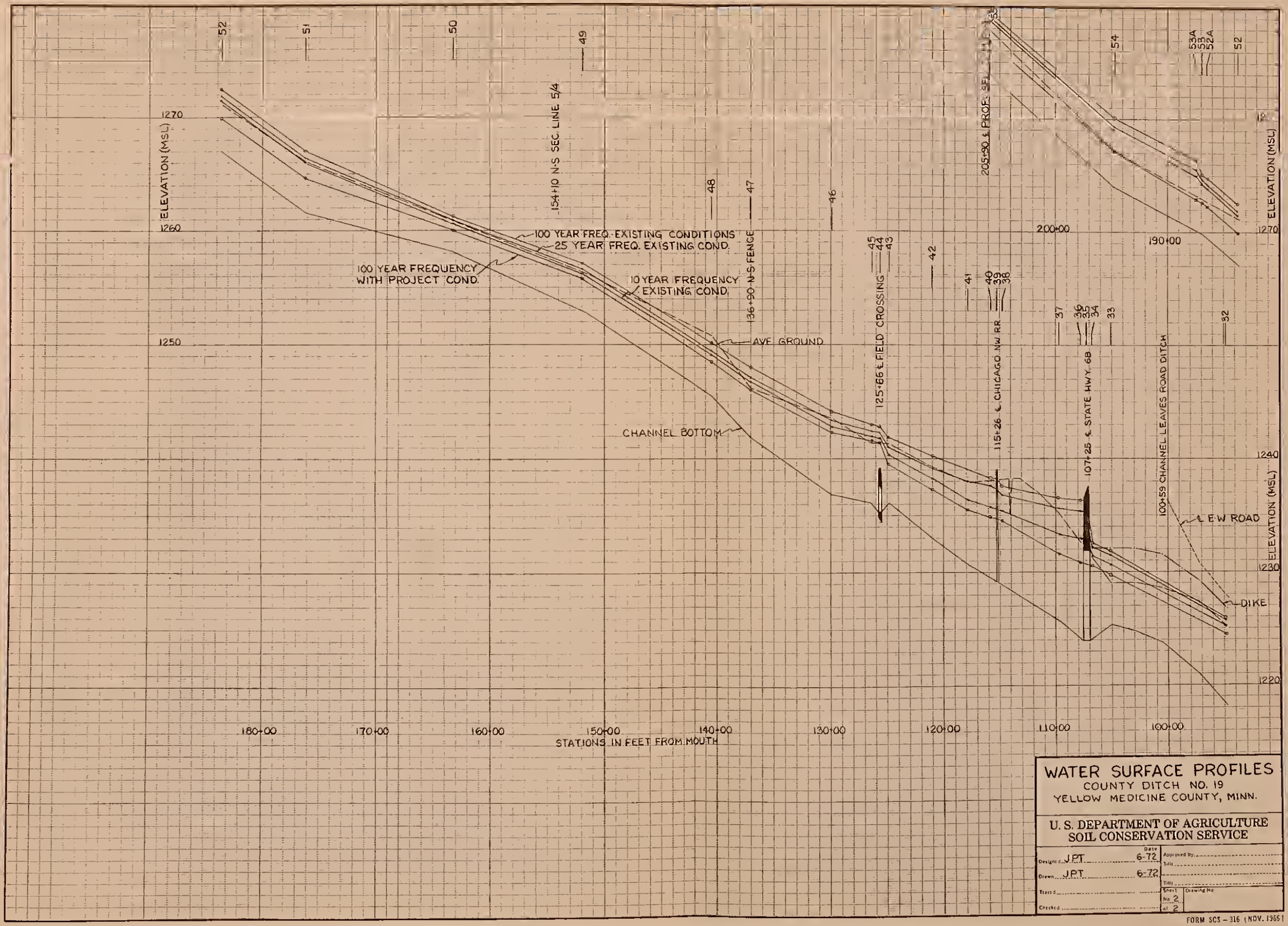


WATER SURFACE PROFILES
COUNTY DITCH NO. 19
YELLOW MEDICINE COUNTY, MINN.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed JPT	Date 6-72	Approved by	
Drawn JPT	6-72	Title	
Traced		Title	
Checked		Sheet No. 1 of 2	Drawing No.

FORM SCS - 316 (NOV. 1966)

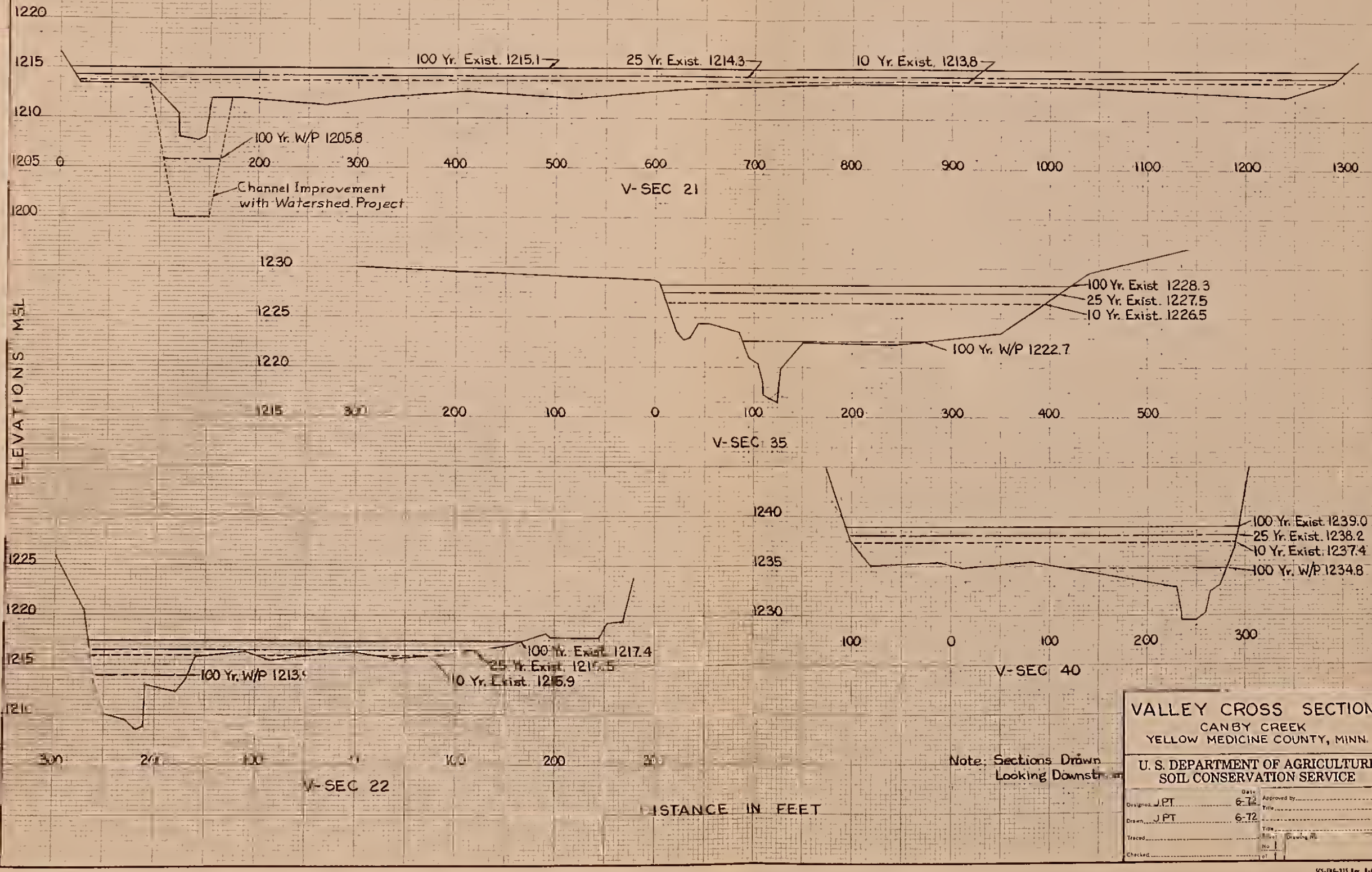


WATER SURFACE PROFILES
COUNTY DITCH NO. 19
YELLOW MEDICINE COUNTY, MINN.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date	
Designed JPT	6-72	Approved by:
Drawn JPT	6-72	Title
Traced		Title
Checked		Sheet No. 2 of 2 — Drawing No.

FORM SCS – 316 (NOV. 1965)



Note: Sections Drawn Looking Downstream

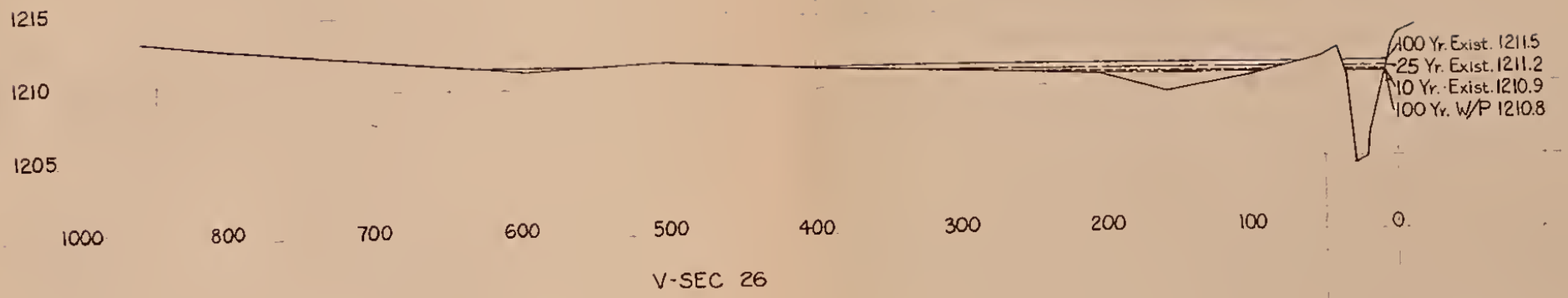
VALLEY CROSS SECTIONS

CANBY CREEK
YELLOW MEDICINE COUNTY, MINN.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

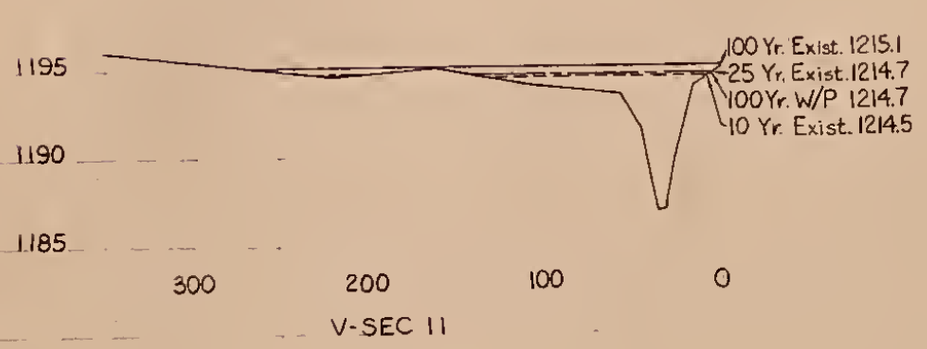
		Date	
Designed	J.PT	6-72	Approved by
Drawn	J.PT	6-72	Title
Traced			Title
Checked			Sheet No. / Drawing No.

SCS-ENG-315 Rev. 8-69

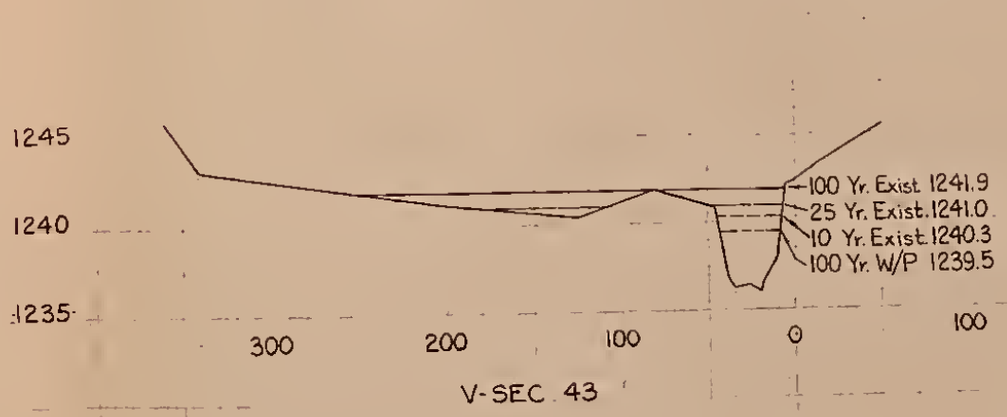


V-SEC 26

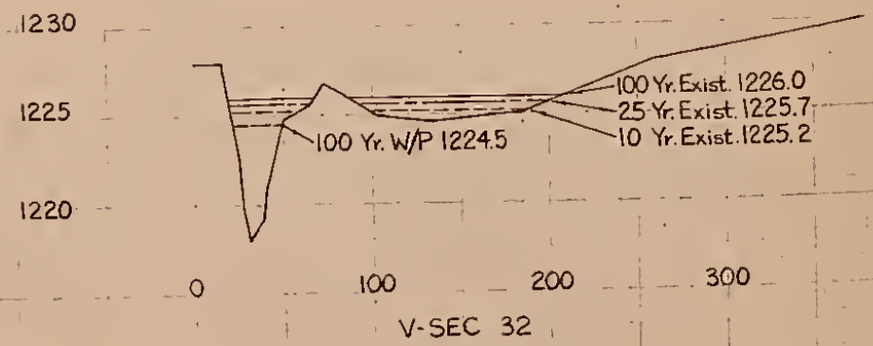
ELEVATIONS - M.S.L.



V-SEC 11



V-SEC 43



V-SEC 32

DISTANCE IN FEET

Note: Sections Drawn Looking Downstream

VALLEY CROSS SECTIONS
COUNTY DITCH NO. 19
YELLOW MEDICINE COUNTY, MINN.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed JPT	Date 6-72	Approved by	
Drawn JPT	6-72	Title	
Traced		Sheet No.	Drawing No.
Checked		of	

SCS-ENG-335 Rev. 8-69

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

LEGEND

STATE LINE
COUNTY LINE
SECTION LINE
SECTION NUMBER 22
PAVED ROAD
GRAVEL ROAD
DIRT ROAD
US NUMBERED HIGHWAY 75
STATE NUMBERED HIGHWAY 68
RAILROAD
BRIDGE
CEMETERY
TOWN
PERENNIAL STREAM
INTERMITTENT STREAM
LAKE
PIPELINE
WATERSHED BOUNDARY

SUB WATERSHED BOUNDARY
FLOODWATER RETARDING STRUCTURE
MULTIPLE PURPOSE STRUCTURE
GRADE STABILIZATION STRUCTURE
STRUCTURE NUMBER R-6
DRAINAGE AREA IN SQUARE MILES D.A. 2.36 SQ MI.
EVALUATION REACH 5
STREAM CHANNEL STABILIZATION
DRAINAGE AREA CONTROLLED BY STRUCTURE
AREA BENEFITED
COMMON FLOOD PLAIN BENEFITED
RECREATION DEVELOPMENT AREA
STATE WILDLIFE MANAGEMENT AREA
PORTION OF NATURAL CHANNEL MAINTENANCE AREA WHICH PROVIDES FOR GRAVEL MINERAL RIGHTS

PROJECT MAP

CANBY CREEK WATERSHED

LAC QUI PARLE, LINCOLN, AND
YELLOW MEDICINE COUNTIES, MINNESOTA

SCALE 1:76,000

SCALE 0 1 2 3 MILES

SOURCE
SCS DRAWING S,R-28096 AND INFORMATION FROM FIELD TECHNICIANS

EQUIONIC PROJECTION

5-28-71
S,R-28097

USDA-SCS-LINCOLN, NEBR. 1972